NOAA FISHERIES

Northwest Fisheries Science Center

Overview of Assessment Process

from data to model to report

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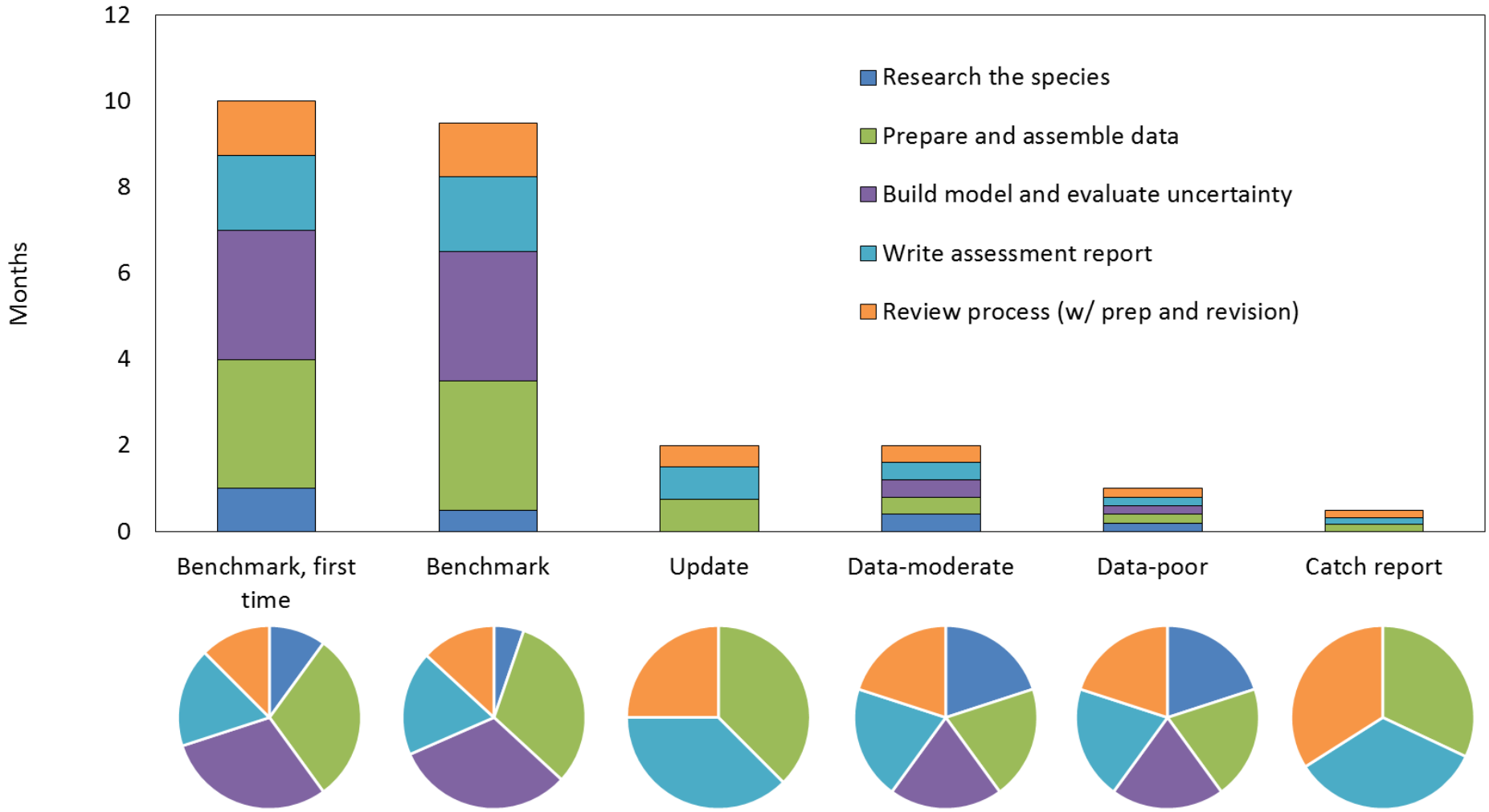
Outline:

- Components of an assessment;
- Timeline in a typical assessment;
- Terms of reference (TORs);
- Assessment data;
- Dealing with technical issues;
- Assessment report;
- Strengths, challenges and solutions.

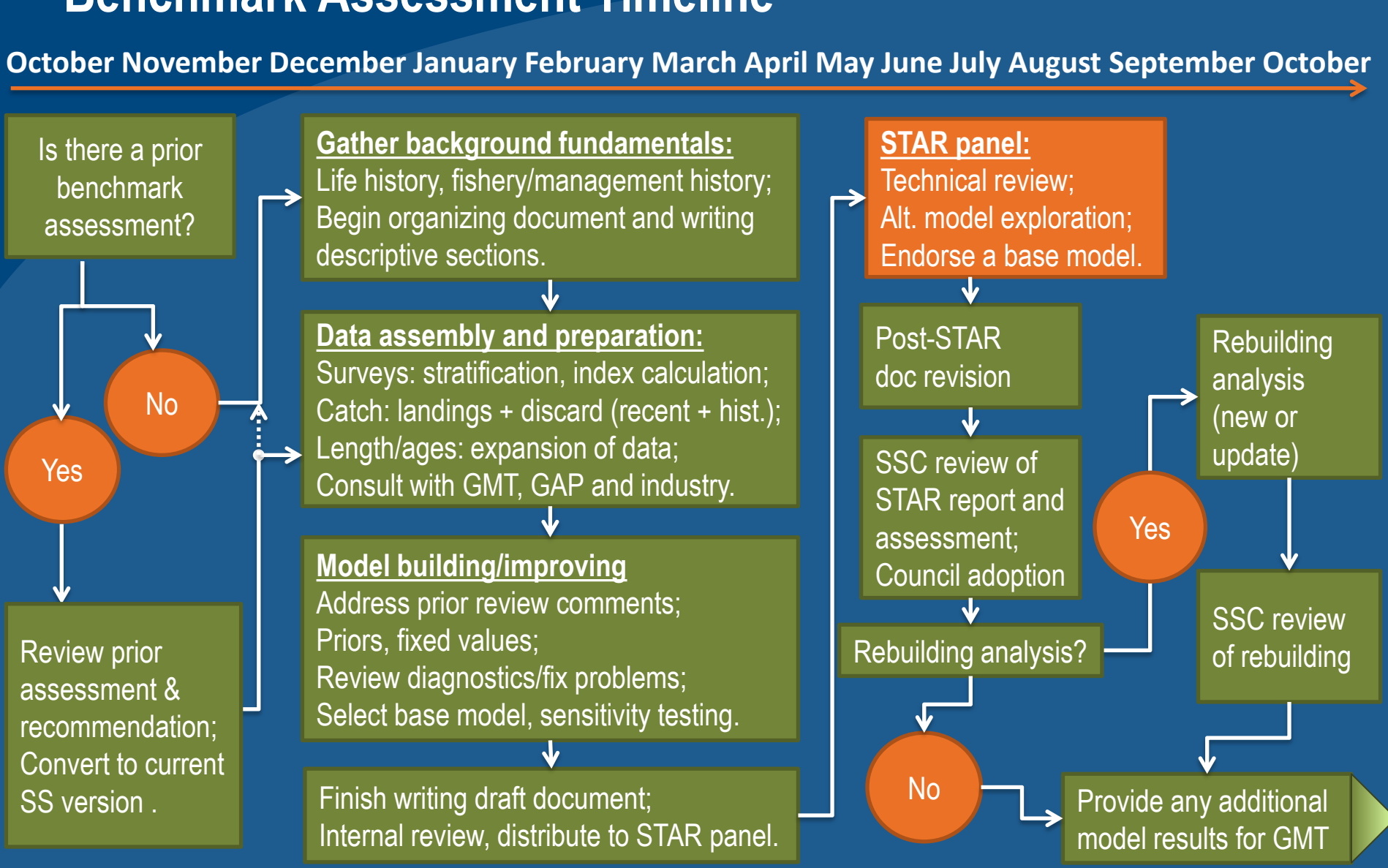
Assessment components:

- Research the species;
- Prepare and assemble data;
- Build the model and evaluate uncertainty;
- Write assessment document;
- Go through review process.

Assessment time spent on component tasks

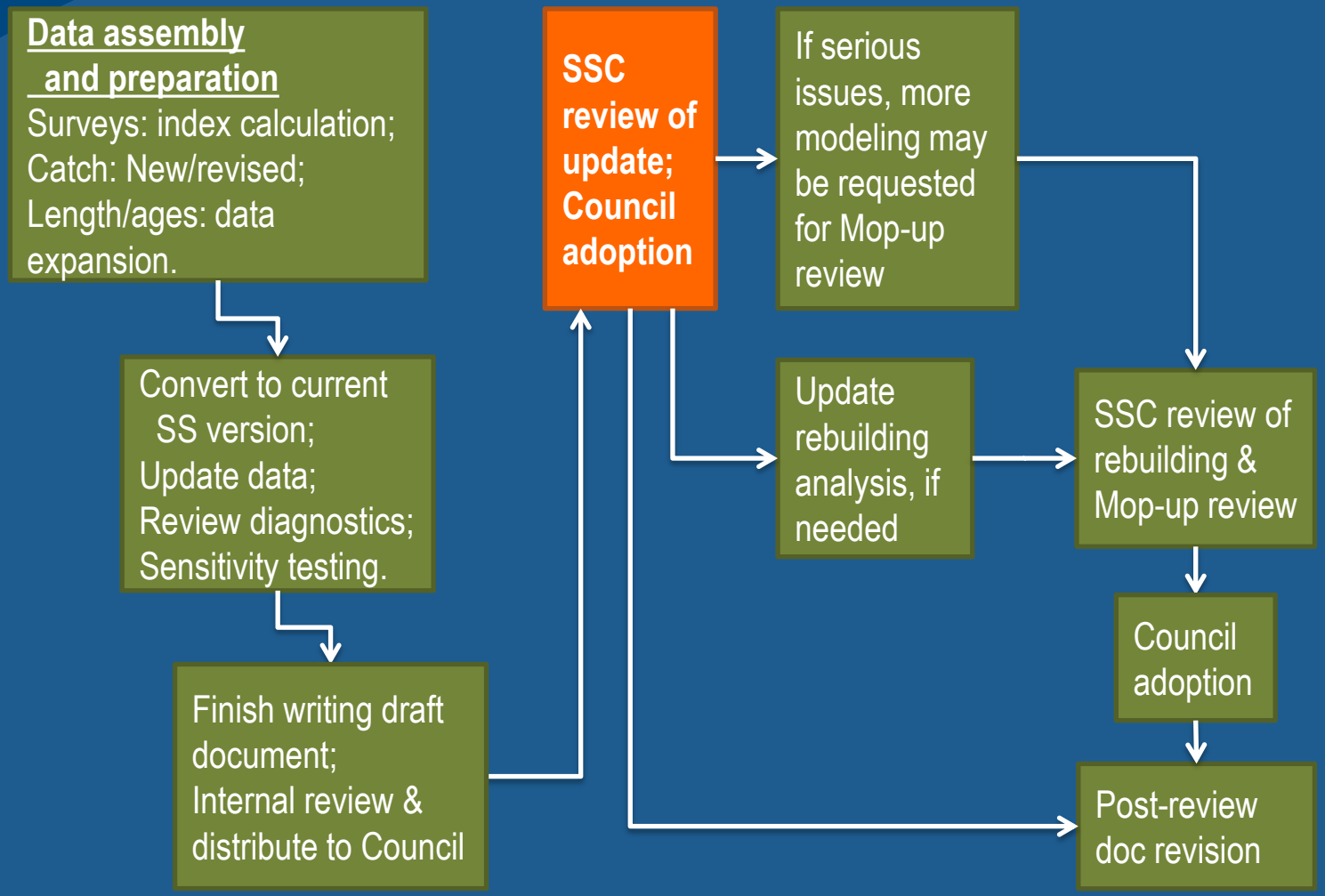


Benchmark Assessment Timeline



Update Assessment Timeline

February March April May June July August September



TERMS OF REFERENCE

FOR THE

GROUNDFISH AND COASTAL PELAGIC SPECIES STOCK ASSESSMENT AND REVIEW PROCESS FOR 2013-2014

Terms of Reference (TORs):

- Outline goals and objectives of stock assessment and review process;
- Describe roles and responsibilities of process participants;
- Discusses different assessment products and establish timeline for all deliverables;
- Provide detailed template for assessment document and executive summary.

Outline:

- Components of an assessment;
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- Terms of reference (TOR);
- Assessment data;
- Preliminary data preparation and analysis;
- Dealing with technical issues;
- Assessment reports;
- Strengths, challenges and solutions.

Stock assessment data:

	Fishery-dependent	Fishery-independent	Life-history
Data type	• Landings; • Observed catch; • Biological data; • Latitude & depth.	• Survey catch; • Biological data; • Latitude & depth.	• Studies on life history parameters; • Spatial variability; • Ecosystem considerations.
Purpose	• Landed and discarded catch estimates; • Length and age structure; • Fishery range & stratification.	• Abundance indices; • Length and age structure; • Stock range & stratification.	• Model structure; • Point estimates; • Prior distributions.

Support in generating input data:

Landings:

- Recent landings available from Pacific Fisheries Information Network (PacFIN);
- Historical foreign removals and domestic landings in Oregon and California reconstructed;

Discards:

- Recent discard - R script developed in collaboration with WCGOP to produce discard rates;
- Historical discard data re-analyzed to improve accuracy.

Tools for generating input data:

Survey abundance indices:

- R script for trawl survey data GLMM;
- R script for hook-and-line and IPHC survey GLM.

Length/age composition data:

- R script to generate length/age distributions that account for non-proportional sampling among:
  - trips and states (fishery-dependent data)
  - tows and spatial strata (surveys).
- Software to generate ageing error matrices.

Assessment model: dealing with technical issues

- Methods used in different assessments are discussed weekly at assessment team meetings;
- Consistent practices are framed to address issues which encompass the majority of assessments;
- Authors focus their expertise on questions specific to their assessments, which may build the ground for future “best practices”;
- Consultations with peers.

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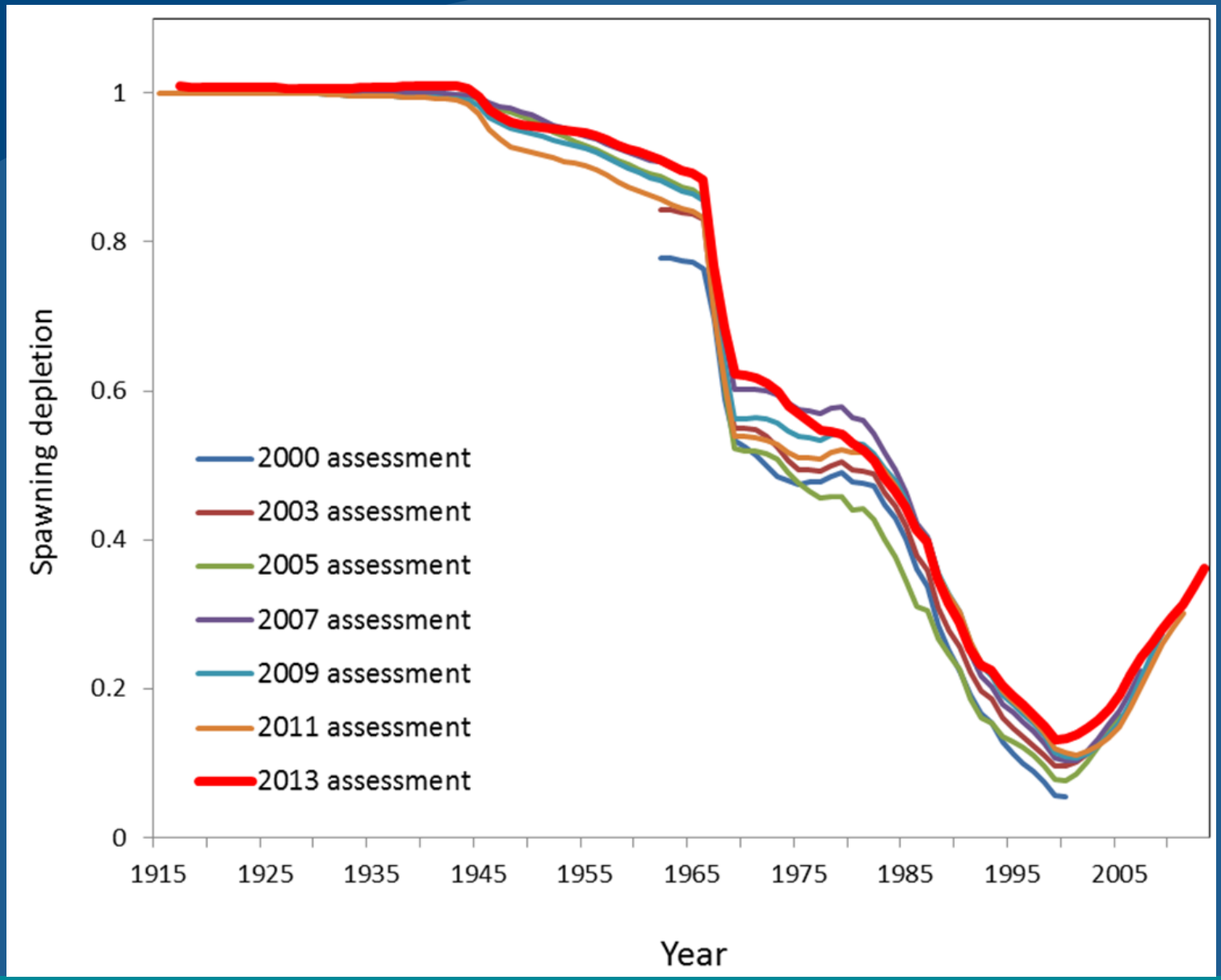
Benchmark assessment report:

- Executive summary
- Introduction
  - Description of species, history of removals;
  - Ecosystem considerations.
- Assessment
  - Description of data, data sources, sample sizes;
  - Description of model; model selection and evaluation.
- Results
  - Time series;
  - Uncertainty and sensitivity analysis;
  - Harvest recommendations and decision table.
- Research and data needs
- Model input files

If species has been assessed before, TORs require:

- Describe the history of modeling approaches;
- Describe changes made from the previous assessment models and explain why;
- Response to STAR panel recommendations from the most recent previous assessment;
- Conduct “Historical analysis” and plot of model output and parameter estimates from current and previous assessments.

Example from 2013 darkblotched rockfish assessment



TORs require evaluate uncertainty:

- Evaluate sensitivity to different assumptions about model structure, data set choice and weighting schemes;
- Explore parameter uncertainty (including likelihood profiles for important assessment parameters);
- Conduct retrospective analysis;
- Develop decision table.

Tools for generating reports:

- **R4SS**
  - Collection of R functions for use with SS;
  - Include tools for summarizing and plotting results, visualizing model parameterizations, and various other tasks.
- **Word template for the assessment document**
  - Developed based on TORs.

Strengths:

- Explicit TOR on process and product;
- Support in preliminary data preparation and analysis;
- Collaboration in conducting assessment;
- Close communication among stock assessors (e.g. weekly team meetings);
- R4SS;
- Multiple levels of review.

Challenges and solutions:

Challenge:

- Data for the most recent year(s) are often not available until late in the process;
  - High work load near review time & repetition of work result from this.

Solution:

- Develop timelines for review accordingly, through close communication among assessors, survey and observer programs.

Challenges and solutions:

Challenges:

- Lack of comprehensive survey data for some species;
- Uncertainty in recreational fishery data; contradictory estimates from different sources.

Solutions:

- Explore alternative survey options;
- Collaborate with RecFIN and state agencies to understand and improve current recreational catch estimates.

Challenges and solutions:

Challenges:

- Inability to reliably estimate some parameters within model (stock-recruit steepness, natural mortality);
- Competing methods for weighting compositional data; unclear which is superior.

Solution:

- Devote research effort to develop analytical approaches to deal with these modelling challenges.

Benchmark Assessment Timeline